Before The
Federal Communications Commission
Washington, DC 20554

In The Matter Of:

Amendment of Part 97 of the	)	RM-8737
Commission's Rules Governing	)	
the Amateur Radio Service to	)	
Facilitate Spread Spectrum	)	
Communications	)	

March 4, 1996

To The Commission:

The following are the comments of Charles M. (Marty) Albert, Jr. KC6UFM

INTRODUCTION

I have recently become interested in the idea of using Spread Spectrum (SS) systems for the purpose of high-speed Amateur Packet Radio networking and began to look for information, especially about the rules that govern this emission type. Upon reading the appropriate sections of Part 97 (97.305 and 97.311), I became somewhat discouraged due to the seemingly over-restrictive limits set on SS operation in terms of spreading systems and record keeping.

I was, however, excited to hear about the proposal for changes made by the American Radio Relay League (ARRL) and wasted no time in locating the text of their proposal. At the same time, I located comments filed by the Tucson Amateur Packet Radio Corporation (TAPR) and by Mr. Robert A. Buaas (K6KGS) both dated February 26, 1996.

After reading the proposal made by the ARRL, I was again discouraged and so I felt the need to make my opinions known to The Commission on this matter.

BASIS OF COMMENTS

I feel that, due to the fact that I am NOT currently active in the use of SS systems in the Amateur bands and am, at this time, investigating the possible use of SS to solve a specific problem, I am in the position to evaluate the impact of the proposed changes on the very

issue that they are intended to solve: How can the Amateur use and development of SS systems be best enhanced?

GENERAL COMMENTS

The ARRL has addressed a very valid point in a very well worded proposal. In general, the idea behind the proposal is good in that it is an attempt to: (1) Ease access to the use of SS for all US Amateurs; (2) Clarify the rules in Part 97 (97.305 and 97.311) to make them easier to understand and meet; (3) Remove the need for The Commission to evaluate STAs for operations outside of the current rules.

Sadly, the ARRL proposal falls short on several matters, many of which have been well addressed by both TAPR and K6KGS.

SPECIFIC COMMENTS

(1) The ARRL writes:

> *Section 97.305(b) is amended to read as follows:*
> *(b) A station may transmit a test emission on any frequency authorized to the control operator for brief periods for experimental purposes, except that no pulse or SS modulation emission may be transmitted on any frequency where pulse or SS is not specifically authorized.*

While K6KGS takes exception to this wording, as does TAPR to a lesser extent, I agree with the ARRL. This wording will avoid possible problems with brief testing being done by those just setting up a SS station.

I do, however, agree with TAPR and K6KGS on the need to include the use of all Amateur bands above 50 MHz for the use of SS emissions. The reason for my support of this change is to allow the use of the VHF bands for SS high speed digital modes where the range of reliable communications would be increased.

This also brings up another issue: In reference to the 6m, 2m, and 125cm bands, Section 97.307(f)(5) states, in part, that a RTTY or multiplexed digital signal may not exceed 19.2 kilobaud if using an accepted code or must be limited to 20 KHz if using a non-accepted code. In reference to the 70cm band, Section 97.307(f)(6) states, in part, that a RTTY of multiplexed digital signal may not exceeded 56 kilobaud if using an accepted code or must be limited to 100 KHz if using a non-accepted code.

I feel that this matter requires clarification by The Commission as well. If using SS systems on, for example, the 2m band with a frequency hopping (FH) scheme that covers a 1 MHz spread, this would appear to violate 97.307(f)(5). Also, using SS systems, there would be little reason why a data rate well in excess of 19.2 kilobaud could not be supported with no increase in interference to other emission types sharing the band.

To this end, I would suggest that The Commission modify 97.307(f)(5) and (6) to exempt SS emissions from these limits. This exemption for SS emissions would also serve to encourage development of SS high speed data services.

(2) The ARRL writes:

> *Section 97.311(a) is amended to read as follows:*
> *(a) SS emission transmissions by an amateur station are authorized only for communications between points within areas where the amateur service is regulated by the FCC and between an area where the amateur service is regulated by the FCC and an amateur station in another country which permits SS communications for its amateur licensees.*

I agree 100% with this proposal. There is little reason to prohibit US Amateurs from using SS to communicate with those in other countries that also allow their Amateurs to use SS systems.

(3) The ARRL writes:

> *Section 97.311(b) is amended by deleting the last sentence thereof.*

Again, I agree with the ARRL on this proposal. Other sections of Part 97 cover this issue and there is no need to repeat it here, thereby singling out SS from other emission types.

As rather elegantly discussed by K6KGS, there is a lot of fear in the Amateur ranks of SS. This primarily due to a lack of understanding and education. (I have had one Extra Class Amateur tell me, "Yeah... I had a spread spectrum radio once... it spread its signal all over the band!") The inclusion of this Section reinforces this fear by implying that SS will cause interference to other emission types while, in reality, the idea and operation is exactly the opposite.

(4) The ARRL writes:

> *Section 97.311(c) and (d) are deleted in their entirety.*

This is the one area that I most strongly agree with the ARRL about. These two paragraphs must be deleted if The Commission ever expects to see any growth of SS in the Amateur Service.

There are many excellent spreading systems and algorithms available to Amateurs that can not be used due to this severe restriction. Even changing these paragraphs to allow for additional systems to be used will not solve the problem as this will continue to block any attempts at experimentation and system development.

If The Commission chooses to make only one change to 97.311, this should be the one that is made.

(5) The ARRL writes:

> *Section 97.311(g) is amended to read as follows:*
> *(g) The transmitter power output must not exceed 100 W under any circumstances. If more than 1 W is used, automatic transmitter control shall limit output power to that which is required for the communication. This shall be determined by use of the ratio, measured at the receiver, of the received energy per user data bit (Eb) to the sum of the received power spectral densities of noise (No) and co-channel interference (Io). Average transmitter power over 1 W shall be automatically adjusted to maintain an Eb/(No+Io) ratio of no more than 23 db at the intended receiver .*

Frankly, this proposed change is ridiculous. The ARRL has clearly no idea of the problems involved in creating a software or hardware system that will RELIABLY adjust the transmitter output power automatically based upon some set of criteria. The key here is "reliably"... It is a trivial matter to develop a system that will adjust the output power based on some feedback, but will it work 100% of the time? I doubt it.

As pointed out by K6KGS, the general requirement of using no more power than needed to communicate covers this issue quite well. Mr. Buaas also points out that no other stations have requirements to use such automatic controls. This segregation of SS systems will only increase the current misunderstandings of the emission type.

Also, as The Commission is aware, SS is a complex system. This complexity seems to be keeping the vast majority of US Amateurs away from the mode. The added complexity of such a useless and unattainable system would serve to keep Amateurs from entering SS operations and chase many away due to the frustrations of trying to meet an unrealistic expectation.

I would encourage The Commission to leave 97.311(g) as it now reads.

SPREAD SPECTRUM AND THE BEGINNER

As I stated earlier, I feel that I have a unique position in this discussion, that of being an "outsider looking in." I am by no means an expert in SS systems and my comments were made from that point.

It seems that SS may very well be the future of both Amateur and commercial communications. The Amateur Service has a long history and tradition, in addition to the obligation, of providing a service to the American public by developing, refining, and perfecting new and exciting communication systems. While SS is readily available at this

time, there is no cause to believe that the state of the art has reached its maximum. This is where the Amateur Service can help the country...

With proper regulations that allow and encourage experimentation and system development and yet protect existing systems from harmful interference, the Amateur Service will be able to enhance new communication systems, including SS.

The Commission is charged with the difficult job of balancing the need for experimentation and preventing interference. In the past, The Commission has allowed the Amateur Service to be largely "Self Policing" and I see little reason that SS should not be the same. By providing rules that are open enough to allow the needed experimentation and yet closed enough to avoid situations that will clearly cause interference and then allowing the Amateurs themselves to handle the more or less local interference problems that will come up from time to time, The Commission will, in my opinion, once again successfully perform their balancing act.

Thank you for your attention and consideration.

Respectfully Submitted,

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cc: TAPR (via www.tapr.org)
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